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Amenity and Environment

The near future will see the publication of the Garrett Report, which is expected to deal, *inter alia*, with the creation of amenities within the foundry industry. There are two ways of dealing with the problem:—(1) To relate the provision of amenities *vis-à-vis* with the number of people employed, and (2) to establish a basis founded on the normal requirements of the individual. For legislative action, the former is the easier, but, for balanced improvements, the latter is the more sensible. We put forward this statement, because locality has such a profound effect on the nature of amenities which can usefully be provided. We, personally, and we think our experience is general, find more satisfaction in the use of our own domestic amenities than in those furnished by the office, hôtel, railway stations, or even the houses of friends. This should be recognised and help given to ensure that foundry employees possess good amenities at home.

Next, it should be pointed out that profound differences exist between the large city, country town and village. The young moulder, working in Glasgow, Manchester or Sheffield, will be spending his evenings at school, the cinema, or the dance hall, and, as he may have an hour's journey to his home or lodgings, it is desirable that he should be able to prepare himself at the foundry for any of these engagements. For the country town, say Bedford or Braintree, the conditions are totally different. Here workers use bicycles as transport. They have time to go home for their mid-day meal, but no time to change out of their working clothes. Superficially, it seems a little futile to provide changing facilities for such people, yet this is not so, as probably the men go no further into the house than the kitchen. For the provision by the works of a large canteen organisation, the position is much more obscure. Because of rationing, there is obviously more use being made of canteens than before the war. In fact, the management of one of the largest foundries in the South of England had, between the wars, to shut down its modern canteen owing to lack of patronage. That was at Letchworth. Men often believe that, when they pay for meals at the works canteen, the money comes out of their own pockets, whilst if they go home, it is the wife's " pidgin." Foundry executives are thinking deeply around this question, because they wish to provide an adequacy, but not make a serious capital expenditure demanding continuous maintenance costs, if it is to be a " white elephant." Reverting to a large city foundry, the ill-usage of the most modern bathing and washing installation has been so marked that the strongest representation has had to be made to the trade union officials to bring about a decent standard of conduct. This is not very encouraging.

Finally, there is the village foundry, employing but two or three men. Here surely the solution lies in seeing that their homes are properly fitted up, so that their families can also enjoy modern amenities. The foundry owner, probably himself a craftsman, should not be saddled with fresh legislation. If one agrees that amenities should be related to employees' needs, rather than factory size, then surely recommendations should take into cognisance the geographical location of the foundry and similar factors.

Contents

Amenity and Environment, 215.—Forthcoming Events, 216.—Bedford Foundry Apprenticeship Scheme, 216.—Experimental Stress Analysis, 216.—Book Reviews, 216.—New Consulting Organisation, 216.—Pipe Line Filters, 216.—Manchester Association of Engineers, 216.—Utilisation of High Sulphur Coke in Foundry Practice, 217.—British Steel Founders' Association, 220.—House Organs, 220.—A Plea for Information, 221.—Side-blown Converter Practice, 222.—Another Unusual Waster, 222.—Theory and Practice of the Aluminium Sand Foundry, 223.—Horn-gates are the Time-savers, 225.—National College for Foundry Industry, 225.—Obituary, 226.—Stocks and Sales of Non-ferrous Scrap, 226.—Sales of Government Surplus Stores and Equipment, 226.—Anti-attrition Metal Company's Capital, 226.—Imports and Exports of Iron and Steel, 227.—Company Results, 228.—Contracts Open, 229.—F. H. Lloyd & Company's Acquisition, 229.—Personal, 230.—February Pig-iron and Steel Production, 230.—United Kingdom Tin Position, 230.—News in Brief, 232.—Aluminium Wire & Cable Company, 232.—Raw Material Markets, 234.

FORTHCOMING EVENTS

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

MARCH 25.

Midland Regional Research Conference:—The first Federation of British Industries Regional Conference, on "Industry and Research," is to be held at the Queen's Hotel, Birmingham, on March 25. Special attention is to be given to the smaller manufacturing concern which cannot afford the cost of a research department, and to the research organisations and facilities which could serve it.

At the Morning Session (10 a.m. to 12.15 p.m.) Sir Peter Bennett, M.P., is to preside, and Sir William Larke, K.B.E., and Dr. J. W. Jenkin (Tube Investments, Limited) are presenting Papers.

At the Afternoon Session (2 to 4.15 p.m.) Sir Edward Appleton, F.R.S., is presiding. Mr. F. G. W. King (Dunlop Rubber Company, Limited) and Mr. J. G. Pearce (Cast Iron Research Association) are the lecturers. The latter is dealing with "The smaller Midland firms and its application of research." The Conference will be summed up by Sir Wallace Akers (I.C.I., Limited).

Institute of British Foundrymen

MARCH 22.

West of England Branch:—"Apprentice Training," by R. T. M. Hoyn, at Grand Hotel, Broad Street, Bristol, at 3 p.m. Followed by Annual General Meeting.

MARCH 24.

Sheffield Branch:—"Machine Tool Castings," by G. W. Nicholls. At Royal Victoria Station Hotel, Sheffield, at 7.30 p.m.

MARCH 26.

West Midlands Branch:—"Cupola as a Precision Melting Unit," by R. A. Tucker, M.A. At James Watt Institute, Great Charles Street, Birmingham, at 7.15 p.m.

MARCH 29.

London Branch:—"Grey Iron Die Castings," by C. D. Pollard, at Waldorf Hotel, London, W.C.2, at 2.30 p.m.

BEDFORD FOUNDRY APPRENTICESHIP SCHEME

W. H. Allen, Sons & Company, Limited, of Queens Engineering Works, Bedford, will accept applications for apprenticeship in their foundry until the end of April. The scheme was described in our issue of March 6, and covers a lodging allowance and free Technical College instruction (daytime) in London. Candidates' travelling expenses will be paid for a visit to Bedford to see the laboratory and foundry. Applications should be addressed to the Educational Adviser, W. H. Allen, Sons & Company, Limited, Queens Engineering Works, Bedford.

EXPERIMENTAL STRESS ANALYSIS

The recently formed informal Experimental Stress Analysis Group is holding its first Conference at University College, London, from March 25 to 27. The programme includes an opening address by Professor J. F. Baker, of the University of Cambridge on "Experimental Stress Analysis" and discussions on brittle lacquers, photoelasticity and electric strain gauges. Further particulars can be obtained from the Honorary Secretary of the Group, Mr. E. K. Frankl, University of Cambridge, Department of Engineering, Trumpington Street, Cambridge.

BOOK REVIEW

The Installation and Maintenance of Air Compressors. By D. Braid. Published by Emmott & Company, Limited, 31, King Street West, Manchester, 3. Price 2s. 6d. net.

Next to the cupola, the air compressor is the most important piece of plant installed in the average foundry, for on its reliable function depends the whole production programme. This well written 50-page booklet contains just the information which the foundry manager needs to ensure reliable functioning. It is presented in three chapters. The first covers the selection of the location of the compressor house and undoubtedly failure to comply with fundamentals will cause endless later troubles. The second covers in a very practical way the installation of the machines, and the third the starting up. Many of our readers will find the perusal of this book most helpful. V. C. F.

NEW CONSULTING ORGANISATION

Powell-Duffryn Technical Services Limited has been established with the object of conserving and placing at the disposal of industry, by means of a consulting engineering organisation, the experience and knowledge accumulated over long years. The P.D. group was, before coal mining became a State monopoly, the largest and most progressive firm of colliery owners in the country, and, during their long existence, carried out much research. Supported by a strong staff, which includes Mr. J. G. Bennett and Mr. W. L. Boon on the fuel economy side and Mr. E. L. Hann as mining engineer, the new firm seems well qualified to advise industrial concerns on fuel conservancy problems at home, or overseas, the exploitation of new mines, or the improvement of existing ones.

PIPE LINE FILTERS

Vokes, Limited, of Henley Park, Guildford, staged an exhibition of their manufacture last week at 69-70, Piccadilly, London, W.1.

Of main interest to foundrymen was a range of compressed air, pipe line filters. The compressed air, in passing through a small cylindrical component, has its speed momentarily reduced by a two hundredth of the initial rate. Entering an annular space, the air is deflected through brass wool and a radial fin formation and passes, free from water and oil, to the moulding machines, pneumatic tools or shot blast.

Dirt, as is well known, can create endless trouble and increase maintenance costs and the filters shown are of interest at the moment as a factor in promoting plant efficiency.

MANCHESTER ASSOCIATION OF ENGINEERS

On the agenda for the Annual General Meeting to be held at the Engineers' Club on March 21, is a resolution for increasing the annual subscription to £2 10s. The Constantine Medal is to be presented to Dr. J. E. Garside, of the Northampton Polytechnic, London, and the Butterworth Medal to Mr. A. Proctor Burman. Sir Frederick J. West, G.B.E., is recommended for the award of honorary life membership.

Utilisation of High Sulphur Coke in Foundry Practice*

The sulphur content of good British foundry cokes is usually below 1.0 per cent. Under present conditions of fuel and transport shortage, some foundries are receiving supplies of coke of inferior quality, and particularly of higher sulphur content, than that to which they are accustomed. Westphalian coke is being brought into the country to ease the supply position, and this coke contains more sulphur than normal British cokes. Because the amount of sulphur present in a cupola coke influences the quantity of this element which is picked up by the metal during melting, the use of such cokes results in the production of metal of high sulphur content.

This report has been prepared for the guidance of founders who are being supplied with German and other cokes in which the sulphur content is in excess of 1 per cent. It is divided into three sections, the first of which indicates the steps which may be taken to overcome the deleterious effect of a high sulphur content on the metal. The second part outlines methods of minimising the pick-up of sulphur during cupola melting, and the final section deals with desulphurisation of molten metal.

The Report is not intended primarily for foundries which are operated under technical control. It is felt that, in such cases, the metallurgist responsible for the quality of the metal will be aware of the limits which need to be placed on the sulphur content, and how a suitable composition may be maintained. Foundry metallurgists may, nevertheless, find the report of interest as a guide to the control of sulphur content.

Balancing Sulphur with Manganese

In the production of many types of iron castings, high sulphur has no adverse effect on the metal so long as it is balanced by a suitable amount of manganese. For example, sulphur contents as high as 0.15 per cent. can be successfully used for important light engineering castings, if the manganese is maintained above 0.8 per cent. With a manganese of only 0.3 to 0.4 per cent. the same sulphur content would cause castings to chill at the edges and give serious difficulties in machining. Where the manganese content of a metal mixture is low, therefore, and an increase in the sulphur content results from the use of high sulphur coke, it may be necessary to raise the manganese content. To prevent any risk of chilling due to high sulphur, the manganese content should, *as a minimum*, be equal to approximately twice the sulphur content, plus 0.3 per cent. For example, with 0.12 per cent. sulphur, the minimum manganese content should be (0.12×2) plus $0.3 = 0.54$ per cent. It is better that the manganese shall be higher rather than lower than this figure, and for safety with 0.12 per cent. sulphur the manganese should be between 0.6 and 0.8 per cent.

If the sulphur and manganese figures are known for a particular mixture it is a simple matter by means of the above equation to ascertain whether sufficient manganese is present. Any foundry which does not operate a laboratory and has reason to believe that coke of high sulphur content is being supplied is advised to have a check made of the manganese and sulphur contents of a representative sample of metal. This sample should be taken at a point approximately midway through the melt.

Increasing the Manganese Content of the Mixture

The simplest and most trouble free method of increasing the manganese content of a mixture is to substitute a pig-iron of higher manganese content for one which is low in this element.

If for any reason this cannot be done, manganese may be added to the charge by means of manganese briquettes or by lump ferro-manganese. Ferro-manganese has a manganese content of approximately 80 per cent., and when charged into the cupola, a melting loss of approximately 25 per cent. is normally experienced. Ferro-manganese is not satisfactory as a ladle addition, and conditions of manganese should always be made to the cupola charge.

MINIMISING SULPHUR PICK-UP IN THE CUPOLA

Initial Pick-up

The sulphur content of the first taps of metal from a cupola at the beginning of a heat, is invariably higher than in those which follow. This is because of the pick-up of sulphur from the new bed coke. Much of this sulphur is taken up by the first metal passing through the bed, and the bulk of the sulphur picked up by succeeding metal charges arises from the charge coke.

Little can be done to obviate the high sulphur content in the first metal tapped (usually metal equivalent to the first two charges). A double limestone charge placed on the bed coke before metal is charged is advantageous. One or more blocks of fused sodium carbonate, depending on the size of the bed, placed on the bed coke will also minimise the initial sulphur pick up. Burning the bed well through before metal is charged helps to drive off some of the sulphur, but if the bed is burned up too far there is a danger that cool metal will be produced at the start of the melt. If some good cupola coke is available, this should be kept for use in the bed, any lower grade coke being used in the charges. This helps to reduce the initial sulphur pick-up.

The use of a higher manganese content than normal in the first two metal charges is a useful precaution where the castings are of a type in which a real danger from chilling exists.

Although the above precautions are effective in minimising the initial pick-up of sulphur and its effect

*Issued by the Council of Ironfoundry Associations

High Sulphur Coke

on the first metal, they are unlikely to be completely effective. Where the coke used is known to be abnormally high in sulphur it is advisable, where possible, to pour the metal from the first taps into castings, the composition of which is relatively unimportant.

Sulphur Pick-Up during the Melt

When iron is melted in a cupola, some increase in the sulphur content during melting is inevitable, and, generally speaking, the higher the sulphur content of the coke, the higher will be the sulphur in the molten metal. Attention to the following factors will assist in minimising sulphur pick-up.

(1) Avoiding the use of excessive amounts of coke, both in the bed and on the charges.

(2) Avoiding severely oxidising conditions in the cupola.

(3) Maintaining a slag of suitable composition.

Items (1) and (2) above are somewhat at variance, but it is obvious that as sulphur arises from the coke, the use of excessive amounts of fuel should be avoided.

On the other hand, with severely oxidising conditions in the cupola, little sulphur is removed in the slag, and the loss of manganese is increased, with the consequent danger of metal being produced, in which the sulphur and manganese are out of balance. The amount of coke used should, therefore, be the minimum which will melt and superheat the metal to the required temperature and at the same time produce a relatively non-oxidising condition in the cupola.

In the ordinary firebrick and ganister lined cupola, a high lime, desulphurising slag cannot be produced, because of its erosive action on the lining. With slags of suitable composition, however, some sulphur can be removed without the risk of serious attack on the furnace lining. The aim should be to produce a slag with a lime content of 25 to 30 per cent. This can normally be secured by using a limestone charge amounting to 25 to 30 per cent. of the weight of the coke charges.

Fluor-spar Additions.—A small fluor-spar addition to the limestone charge produces a fluid slag and assists in keeping sulphur pick-up to a minimum. Care must be taken not to use this material in excess, on account of its erosive action on the lining. A suitable mixture consists of 5 lb. of fluor-spar and 15 lb. of limestone per cwt. of charge coke.

Sodium Carbonate as a Cupola Flux.—Sodium carbonate added to the normal limestone charge in the form of fused blocks assists in minimising sulphur pick-up in the cupola. The addition should be at the rate of 3 to 5 lb. of sodium carbonate per cwt. of coke used on the charges. The success of all methods of slag control for minimising sulphur pick-up depends largely on the maintenance of a body of slag in the cupola through which the molten metal must pass. For this reason, cupolas operated with a continuous tapping and slagging spout, in which a large body of slag is continually held in the well, will give more consistent sulphur figures than where the slag is completely removed at intervals. When high sulphur coke is used, efforts should be made to maintain a slag layer on top of the metal in the well throughout the melt.

Producing Low Sulphur Metal from the Cupola

In the conventional acid, *i.e.*, firebrick and ganister lined cupola, a basic highly desulphurising slag cannot be produced for reasons already stated. If a basic refractory lining is provided, however, desulphurisation in the cupola becomes possible and metal with a sulphur content below 0.06 per cent. can be tapped even when high sulphur materials are charged. Further information on this subject is available in published literature.[1] The installation and operation of a basic lined cupola calls for a special technique and is not to be lightly undertaken. In special cases, where a definite need exists for the production of low sulphur metal direct from the furnace, the basic lined cupola offers a completely satisfactory solution.

Desulphurisation of Molten Metal by Sodium Carbonate

Metal which, as tapped from the cupola, is too high in sulphur for the production of satisfactory castings can have its sulphur content reduced by treatment with sodium carbonate. The use of this process will apply mainly to castings in which the sulphur must conform to a low specification or where a combination of high sulphur scrap and coke results in the production of metal abnormally high in this element. The normal treatment in a ladle lined with firebrick, ganister or loam, will reduce the original sulphur content by about 50 per cent. By the use of special methods, the sulphur removal may be increased to the order of 75 per cent.

Desulphurising in the Pouring Ladle.—When a small quantity of metal has been run into the ladle, *i.e.*, sufficient to cover the bottom, the required amount of sodium carbonate (soda ash) is added. Granular sodium carbonate is normally used at the rate of 25 to 30 lb. per ton of metal treated. The sodium carbonate rapidly melts and carbon dioxide is evolved, which together with the stirring action of the metal stream, serves to produce an intimate contact between the sodium carbonate slag and the iron.

The desulphurising reaction takes place almost instantaneously and, when tapping is stopped, the molten soda slag rises rapidly to the surface and deslagging of the ladle can be begun without delay. This can best be carried out using a skimmer with a hard-wood blade and, if the ladle is tilted, the bulk of the slag can be run and raked off without difficulty. The last traces of slag are thickened by the addition of a small quantity of limestone chippings (approximately $\frac{1}{4}$th to $\frac{1}{16}$th particle size). If this is thrown over the surface of the metal and rabbled with the soda slag, the latter is converted into a dry clinker which can be readily removed.

It is most important in carrying out the desulphurising process to ensure that there is no contamination of

[1] Basic Cupola Process for Desulphurisation. Foundry Trade Journal, Vol. 70, No. 1401, June 24, 1943. I.B.F. Proceedings, Vol. 37, 1943/44. First report on the Basic Cupola.

the soda slag with siliceous material such as cupola slag and sand, etc. For this reason it is essential that no cupola slag is tapped with the metal and that the cupola spout and ladles are kept in good repair. For the above reason, the first batch of metal treated in a newly lined ladle may not be desulphurised to the same extent as subsequent batches. Once the ladle has been used with the soda ash, however, the pores of the refractory become filled and the lining is glazed over with soda slag. Dry sand may be used in place of limestone chippings for thickening the last traces of soda slag, but it is emphasised that sand should never be thrown on to a ladle of metal when any appreciable amount of sodium carbonate slag is present.

Obtaining Maximum Desulphurisation

The process already described, if carried out with attention to the precautions outlined, will remove at least 50 per cent. of the sulphur present in the metal and is sufficient for most purposes. In cases where a low sulphur specification has to be met, using very high sulphur charge materials, it may be desirable to secure an even higher degree of desulphurisation. If the desulphurising treatment is carried out in a ladle lined with a basic refractory, sulphur removal can be increased to 60 to 65 per cent.

Fired stabilised dolomite bricks have been found to form a satisfactory basic lining material for desulphurising ladles. The increased efficiency obtained from the use of a basic ladle for desulphurising is entirely due to the reduced amount of siliceous material in the lining, and it will therefore be seen that the successful operation of the process is again dependent on preventing cupola slag and sand, etc., from entering the desulphurising ladle.

An even higher degree of desulphurisation can be secured by what is known as the "double pouring" method. In this process the molten metal, together with the soda slag, are poured from the desulphurising ladle into a second ladle from which the slag is removed in the normal way. The additional mixing of the soda slag with the metal thus secured, gives a further removal of sulphur, and one firm using a basic lined desulphurising ladle in conjunction with a firebrick lined receiving ladle has reduced initial sulphur contents of 0.2 down to 0.045 per cent. consistently in normal practice.

Desulphurising in a Receiving Ladle

In light castings foundries, where the metal is handled for pouring in relatively small quantities, it cannot be desulphurised in the pouring ladle. It is therefore necessary to carry out the desulphurising treatment in a receiving ladle. In foundries where the metal is already distributed for pouring through a receiving ladle, the treatment may be adopted without much alteration to practice, but it should be borne in mind that, where present practice is to tap direct from the cupola to the pouring ladles, the introduction of a receiving ladle will cause a fall in the pouring temperature of the metal, and cupola practice may have to be modified to accommodate this.

The receiving ladle used for desulphurising should be of the teapot spout type which delivers metal from the bottom of the ladle. An addition of sodium carbonate at the rate of 1.5 lb. per cwt. of metal is made as the ladle is filled for the first time. Sufficient metal must be tapped to seal the entrance to the teapot spout before the soda ash is added. When the ladle is filled, the metal can be distributed, but enough must be left behind to ensure that the soda slag does not enter the teapot spout. When the next tap is made, the addition need be only at a rate of 0.5 to 0.75 lb. per cwt. of metal tapped. If the ladle is large enough to accommodate a fairly large bulk of soda slag, this process can be repeated throughout the heat, excess slag being poured off from the back of the ladle as necessary. When the desulphurising treatment is carried out continuously at one point in the foundry, it is advisable to erect a hood with an exhaust to carry away the fume produced by the process.

The successful desulphurisation of light castings is very dependent on producing hot metal from the cupola, so that after transfer to the pouring ladle, the metal is of adequate temperature. The use of a well preheated receiving ladle and hot pouring ladles is a great advantage in reducing temperature losses to a minimum. It is also very important that throughout the melt no cupola slag should be allowed to enter the ladle. Should this at any time occur, the whole of the desulphurising slag should be removed and a new slag should be made.

Effect of Desulphurisation on Metal Composition.—The carbon and phosphorus contents of cast iron are unaffected by the desulphurising treatment and its effect on the manganese content is so small as to be negligible. Some silicon is removed from the metal during the process and the more effective the desulphurisation, the higher will be the silicon loss. Over the range of compositions used for general engineering castings, a loss of between 0.1 and 0.2 per cent. silicon should be expected.

Summary

(1) If cupola coke of high sulphur content is used, the sulphur content of the metal will be increased.

(2) The ill-effects of high sulphur on the metal can often be offset by increasing the manganese content.

(3) In order to neutralise the effect of sulphur, the manganese should at least equal twice the sulphur content plus 0.3 per cent.

(4) The highest sulphur pick-up is experienced in the first taps of a heat. This pick-up can be reduced by flux charged on to the coke bed, but the first metal melted when high sulphur coke is used should not be poured into important castings.

(5) Sulphur pick-up can be minimised by operating the cupola with a suitable slag.

(6) Metal for the production of castings to meet a low sulphur specification should be desulphurised.

(7) Wherever possible, if a supply of good grade low sulphur coke is available, this should be retained for use in the bed only, utilising the lower grade coke for the charges. This will help to reduce the initial sulphur pick-up referred to in item 4 above.

D

BRITISH STEEL FOUNDERS' ASSOCIATION

At the annual general meeting, held recently, 47 firms were represented, proxies being lodged in favour of a further 11 members. The following officers were appointed for 1947:—*Chairman,* Mr. C. S. Gill, Davy & United Roll Foundry, Limited; *Vice-Chairman,* Mr. F. A. Martin, Samuel Osborn & Company, Limited; and *Secretaries,* Messrs. Peat, Marwick, Mitchell & Company.

Executive Council.—Mr. J. Gibb, Carntyne Steel castings Company, Limited; Mr. R. Scott, Atlas Steel Foundry & Engineering Company, Limited; Mr. A. Lindsay, Wm. Beardmore & Company, Limited; Mr. R. Miles, Head, Wrightson & Company, Limited; Mr. T. H. Summerson, Thomas Summerson & Sons, Limited; Mr. W. K. Davy, David Brown Foundries Company; Mr. H. Humphries, Hadfields, Limited; Mr. F. A. Martin, Samuel Osborn & Company, Limited; Mr. F. W. Rowe, K. & L. Steelfounders & Engineers, Limited; Mr. C. H. Kain, Lake & Elliot, Limited; and Mr. F. H. Treherne-Thomas, R. Nevill & Company, Limited.

Main Technical Committee.—Dr. R. Hunter, Clyde Alloy Steel Company, Limited; Mr. J. C. Simonson, National Steel Foundry (1914), Limited; Mr. W. Ballantyne, Stewarts and Lloyds, Limited; Mr. D. K. Barclay, Head, Wrightson & Company, Limited; Mr. R. Elwen, E. Jopling & Sons; Mr. Basil Gray, English Steel Corporation, Limited; Mr. J. F. B. Jackson, David Brown Foundries, Limited; Mr. F. Cousans, Catton & Company, Limited; Mr. A. B. Lloyd, F. H. Lloyd & Company, Limited; Mr. D. E. B. Barnard, Barnard & Sons, Limited; Mr. W. Brindley, the Daimler Company, Limited; Dr. H. Elliss, K. & L. Steelfounders & Engineers, Limited; Mr. A. Hamilton, A. Hamilton & Sons, Limited; Mr. C. H. Kain, Lake & Elliot, Limited; Mr. L. W. Sanders, Lake & Elliot, Limited; Mr. W. T. Laverton, Robert Hyde & Sons, Limited; Mr. D. O. Lewis, the Glanmor Foundry Company, Limited; Mr. R. J. Richardson, Brown Lenox & Company, Limited; Mr. E. Williams, Richard Nevill & Company, Limited; and Mr. G. T. Hampton, F. H. Lloyd & Company, Limited.

Development Committee.—Mr. J. G. Wilson, Carntyne Steel Castings Company, Limited; Mr. G. M. Menzies, North British Steel Foundry, Limited; Mr. J. Jackson, Jackson Elphick & Company, Limited; Mr. G. Blair, George Blair & Company, Limited; Mr. T. H. Summerson, Thomas Summerson & Sons, Limited; Mr. N. Butterworth, Crofts (Engineers), Limited; Mr. D. E. Catton, Catton & Company, Limited; and Mr. A. Hamilton, A. Hamilton & Sons, Limited; Mr. F. A. Martin, Samuel Osborn & Company, Limited.

The report of the Main Technical Committee records much valuable work carried out during 1946. The work covered a wide field, including the operation and performance of sand mills; core stoves and core drying; both pneumatic and airless shot-blast plant and equipment; noise abatement in fettling shops; elevators and conveyors, and the relative performance of different types of moulding machines. The Technical Committee has been engaged in drafting a full and comprehensive

(*Continued at foot of next column.*)

HOUSE ORGANS

Bulletin of the Council of Ironfoundry Associations, February-March.

These issues for February and March, owing to the "crisis," have had to be telescoped into one. It carries useful directions for overcoming post-crisis difficulties. Work in conjunction with the unions is in progress to mitigate the nuisance of youths being called up for compulsory service with the forces. The number of film strips now available for educational purposes has risen to ten. The one on blueprint reading should be exceptionally useful. The Government, at the request of the C.F.A., is preparing a specially suitable form for taking the 1947 Census of Production. As there is a delay in the provision of stereos of "Conditions of Sale," the Association is temporarily making available printed gummed sheets at the price of 2s. 6d. a hundred. There is a useful article on the provision of meals in small canteens, and notes on transport charges and on the Iron and Steel Distribution Scheme which was sent out to foundries in error.

Bulletin de l'Association Amicale des Anciens Elèves de L'école supérieure de Fonderies, March, 1947.

The bulletin of the Old Boys Association of the Paris Foundry High School, lists the names of 47 graduates who finished their studies this year. The corresponding output of the non-existing British equivalent was, of course, zero. *Verb sap.*

(*Continued from previous column.*)

series of steel castings specifications, covering both carbon and alloy steel castings, and has been co-operating with the British Standards Institution in this matter. The Committee is anxious to avoid the multiplicity of specifications which has for some time confronted both the steelfounder and the engineer, while at the same time covering adequately all branches of the engineering industry so far as steel castings requirements are concerned.

The Committee records the success of its first Technical Convention, and expresses the hope that such Conventions will become an annual feature of future programmes.

The Technical Committee also records investigations carried out into various types of bentonite, with a view to discovering a suitable substitute for Wyoming bentonite within the sterling area. It also records its part in framing the draft statutory Regulation on the use of non-siliceous parting powders.

The Technical Committee held seven meetings during the course of the year, and delegated the majority of its problems for prior consideration to the Regional Technical Committees on which every firm in the industry, each in its region, is represented. It is therefore able to record the extent to which the technical advancement of the whole steelfoundry industry is participated in by all firms, irrespective of size.

The Committee gave assistance and advice to various users of castings who had written for information. It is hoped that, as the work of the Committee becomes better known, more use will be made of its services.

A PLEA FOR INFORMATION

By "ONLOOKER"

The President of the Board of Trade has, of late, adopted a policy of plain speaking, a refreshing and much-needed illumination in the fog of easy-going optimism which has enshrouded the political situation of late and left the country under the impression that prosperity is still just round the corner. Recent events, including the disastrous shortage of fuel which has put so many factories on short time, may, to some extent, have shaken the public confidence, but among a certain section of the community there is apparently an ingrained impression that all can be safely left to H.M. Government.

It is perhaps not fair to blame the man in the street too severely, for he is kept very much in the dark, and therefore Sir Stafford Cripps's remarks in the House during the second reading of the Statistics of Trade Bill are distinctly heartening. He said, "Industries require to know all the facts, not only about the commodities in which they themselves deal and which they themselves produce, but also about general questions of production in the country. They require the fullest and most accurate information about raw materials or semi-manufactured goods which they utilise and about the volume of overseas trade."

There cannot be any doubt that the non-ferrous metals industry is more statistically minded than it was before the war for, during the past few years, everyone connected with the trade has become accustomed to providing data for Government returns, and this provision of information goes on even though some of it is now handled by the British Non-ferrous Metals Federation. This body issues month by month details of consumption of copper, both primary and secondary in this country, and the Government (somewhat belatedly) provides stock figures of the chief commodities. All this is decidedly helpful and will, it is hoped, be expanded in due course to present an even fuller picture. We still lag behind the American Bureau of Metal Statistics in the way of setting out this kind of information.

Awkward Surprises

But, at present, it is something rather more than statistics that is wanted. The trade needs, in Sir Stafford's own words, "facts about commodities." Manufacturers connected with non-ferrous metals have had some awkward surprises sprung on them during the past twelve months or so until to-day, they are in the mood of those who believe that "anything can happen." It will be remembered that in December, 1945, the Ministry of Supply, sole purveyor of lead in this country, withdrew from the market without notice, only returning as a seller in the New Year on a higher price basis and with a rationing scheme into the bargain. In regard to this drastic action, no clear picture has ever been given, but from time to time a statement in somewhat vague and general terms has been made in the House of Commons which certainly has not helped in the slightest since it has merely stated what everyone knew, namely that there is a world shortage of this metal and that under bulk purchasing "rules," everything possible is being done to alleviate the trouble.

Beyond that, manufacturers are told nothing and have no idea what cover the Government has for future needs and how industrial activity is likely to be affected. At the beginning of this year, for example, there was a further cut in the allocation of lead to many industries and this came like a bolt from the blue. In circumstances such as these it is obviously impossible for industry to make any plans ahead.

A good deal is heard to-day about the need for the industries of the country to operate in partnership with the Government. If that means anything at all, it surely suggests mutual understanding. Nowadays it would seem that the arrangement is somewhat one-sided. Whereas the manufacturer is called upon to furnish exhaustive details of what is going on in his organisation, the various Ministries to a great extent keep their own counsel. A policy of this kind admitted of no argument during the war, for it was obvious that, in the national interest, the authorities had to keep mattters close.

Now things are very different and there is no question about "letting the cat out of the bag." The producers certainly know quite a lot about the Government's purchasing and a good deal about the policy behind it, or else they must be very bad at putting two and two together. But British consumers are told nothing and must glean their information from newspaper reports. Is it surprising that some of the stories in circulation are not by any means as accurate as they should be? Rumour is only too often "a lying jade."

Bolts from the Blue

It is certainly most unfortunate that when shocks on the question of supplies have to be administered, they come as a bolt from the blue. Though the unfortunate consumer may have a shrewd idea that all is not well, he never knows how successful, or unsuccessful, the Ministry has been in looking after his interests.

In happier, and from the country's point of view, more prosperous, days, business people were allowed to conduct their own affairs and to exercise the skill and ingenuity born of experience. Now they sit in the stable and watch the efforts of the Civil Servants who occupy the stage and struggle with problems which are admittedly not easy. The policy of secrecy adopted by the authorities would be more bearable if, when the announcements came, they were of a favourable nature, but in regard to non-ferrous metals this has not been the case.

Last year saw an unprecedented rise in the values of non-ferrous metals, the introduction of a rationing scheme in lead and the emergence of grave fears regarding supplies of zinc and copper. And at this moment the consumers, already harried by lack of coal, have no definite news of what is in store for them in regard to supplies of raw material.

There may be times when "silence is golden," but on matters relating to the conduct of an important industry the proverb is out of place—at any rate when we are struggling to get back to normal.

SIDE-BLOWN CONVERTER PRACTICE

The first report of the side-blown converter practice sub-committee of the Steel Castings Research Committee was discussed at a meeting held in the offices of the Iron and Steel Institute on March 20. The following conclusions were drawn and recommendations made.

Investigations have shown that there is a wide variation in converter design and operation and in the composition and temperature of the metal charged at the four plants studied. There is reason to believe that even wider differences exist amongst the many firms operating side-blown converters. It is interesting to note, however, that despite these differences the quality of the finished steel is uniformly high, having properties similar to open-hearth steel. This is not surprising, as the study has shown the side-blown converter process to be predominantly one of metal-slag reaction and not one of metal-air reaction, as in the Bessemer process. Another similarity to the open-hearth process is that silica in the slag is reduced during the last stages of the blow, this reaction being accelerated in the case of high-temperature heats.

The silicon in the metal charged into the converter functions as a kindling agent, as its oxidation raises the temperature of the bath to a point at which the rapid oxidation of carbon commences, *i.e.*, 1,450 deg. C. It follows that the initial temperature of the metal has a large bearing on the amount of silicon necessary to raise the temperature of the bath to this critical point. Additions of ferro-silicon are often made before or during the blow, and it is suggested that economies in working would result from the correlation of these additions with the temperature and composition of the metal charged. In any case, ferro-silicon additions to very hot iron should be limited if the risk of excessive silicon in the blown metal is to be avoided. A high carbon content in the metal charged is desirable, and this can be obtained by using cupolas having deep wells.

Good side-blown converter practice shows an overall thermal efficiency only slightly lower than that of the usually accepted order in the acid open-hearth process (14 to 17 per cent.). Lower thermal efficiencies result from more extreme operating conditions, *e.g.*, low vessel temperature at charging, low carbon metal, large ferro-silicon additions during the blow, and low silicon metal of high temperature.

The conversion loss with the current practice at the plants examined varies from 6 to 13 per cent., and the Report indicates that attention to details of operation should result in a uniformly lower loss than the present average.

Metal composition, blast volume, tuyere area, bath area, and depth of well, are all related as regards economical working of the process, but further experimental work is necessary before the ideal design of plant can be suggseted. There are indications that desirable conditions include a shallow well and a fairly large distance from tuyeres to nose.

The Sub-Committee retains an open mind on the value of converter gas composition and its relationship to the metallurgical changes taking place. They con-

(*Continued at foot of next column.*)

ANOTHER UNUSUAL WASTER

By "CORONER"

Castings, produced regularly by the same method without giving trouble, occasionally turn out defective for no apparent reason. In most cases, the cause is easily discovered, but at times, the reason is more difficult to find.

One such case concerned a tubular base of a machine tool. It weighed about 10 cwt. and was cast in two boxes horizontally. The particular casting in question came out with a serious defect on the edge of the flange, together with unsightly marks on the face of the casting, caused apparently by the top face of the core scabbing. As the technique developed for this job—a dry sand mould and core—had been responsible for first class castings and the same personnel were still employed on the job, the reason for the defect was not easily discovered.

Ultimately, the cause was traced to the fact that, due to some unforeseen factor, a slight disorganisation had taken place in the shop, which resulted in the top half of the mould not being ready for storing at the prescribed time. As the bottom mould was ready and had been previously loaded on to the drying store carriage it was dried along with the other moulds. The next morning the cores were assembled in the bottom half in the usual manner but the mould had to be placed on one side to await the dried top half. This duly arrived the following morning, and was placed on the bottom and the runner and riser bushes made up, and the job ultimately cast.

It should be an axiom in good foundry practice, never to put hot cores in a greensand mould, or cold cores in an exceptionally warm mould, as the condensation resulting will be sufficient to cause trouble from blowing or scabbing. The oversight of this simple fact led to the scrapping of the casting in question, for the top mould was much warmer than the bottom in which the cores had been assembled and after final closing, the phenomena known as "steaming" occurred. To have avoided this, either the top should have been cooled to the temperature of the bottom containing the cores, should have been raised to the heat of the top.

This unfortunate experience is but one more example of the care and vigilance needed by foundrymen to avoid Wasters.

(*Continued from previous column.*)

sider, however, that, provided representative samples of the gaseous products of reaction can be obtained, it is likely that important information regarding the reactions in the converter and its efficient working could be deduced from the gas analyses. One very interesting feature of the investigation was the revealing of the presence of free carbon in the gas, indicating the reduction of carbon dioxide and/or carbon monoxide and consequent endothermic conditions.

It appears advisable to vary the blast volume during the blow to allow for the varying requirements of air for oxidation and in order to reduce to a minimum any chilling effect on the bath and heat lost in ejections.

Theory and Practice of the Aluminium Sand Foundry

Discussion

Mr. E. Raybould's Paper, "The Theory and Practice of the Aluminium Sand Foundry," presented to the London branch of the Institute of British Foundrymen, was published in the FOUNDRY TRADE JOURNAL *for March 6 and 13.*

MR. E. H. BROWN, after thanking Mr. Raybould for the very interesting manner in which he had presented his subject, referred to the serration of chills, and asked what he considered to be the optimum size of the serrations.

MR. RAYBOULD replied that the size of the serrations would vary, of course, with the size of the casting involved. He had known heavy section castings in both aluminium and magnesium alloys where the chill serrations had been extremely severe, of the order of $\frac{1}{4}$ in., or even $\frac{3}{16}$ in. in depth; in smaller section castings they would not be so severe. However, a very coarse rasp was probably indicative of the best order of roughness.

MR. W. C. GLADWELL, referring to chills for ingot moulds, said the material of which the chill was made was considered by some people to be important. But at very slow rates of pouring, the metal shrank away from the mould surface, in which case the thermal conductivity of the chill did not matter so much. If it shrank away very rapidly, the size of the chill did not matter much either. He asked for Mr. Raybould's opinion on that matter. He also asked whether, in aluminium alloys, gas porosity showed in a manner similar to that in copper alloys, *i.e.*, by forming cauliflower heads. If so, why was it necessary to go to the trouble of making a semi-vacuum test?

Importance of Thermal Conductivity

MR. RAYBOULD said the casting of ingots into moulds for billets, and so on, was hardly within the province of his Paper; nevertheless, he endeavoured to help. There was no doubt, of course, that shrinkage took place fairly rapidly between the ingot and ingot mould; but he was quite sure that the thermal conductivity of the material was very important. The metal would be in close contact with the mould until it began to solidify, and that was an important part of the freezing mechanism. Even if the metal might not be in very close contact with the mould, the cooling characteristics were still very evident. Proof of this was apparent in the difference which existed between the freezing characteristics of die castings and sand castings.

The existence of gas in aluminium alloys was not so evident as in copper alloys, at any rate, not to the extent of creating cauliflower heads. It was possible to discern the gas escaping from metal with a very high gas content before the risers solidified, but freedom from that condition could not always be regarded as indicating complete freedom from gas porosity. In aluminium alloys, gas porosity was not always obvious, except by sectioning the castings. Even moderate gas porosity had an influence on mechanical strength, so that it could not be regarded as of no importance.

MR. P. D. LIDDIARD, who agreed with the Author that there was little difference between shrinkage porosity and minor gas porosity, said that his own experience was concerned more with copper alloys. A small amount of gas in such alloys, even if it did not give rise to cauliflower heads, was sufficient nevertheless to make the castings otherwise useless. He felt that in such cases, where one found what was normally called shrinkage porosity, there must be some vapour phase, no matter how small, and that if there was anything in the way of gas, no matter how small the quantity dissolved in the metal, it would find its way to the shrinkage pores; and as the amount of gas increased, the ease with which the gas would come out and the ease with which the shrinkage occurred must increase. The effect of having a large amount of gas present, with the tendency for some part of the casting to be better fed as the result of that internal pressure, was obvious. Nevertheless in certain copper alloys, in single castings, one could see both macro- and microporosity present at the same time, although not usually in adjacent parts of the same casting.

Chill Conditions

With regard to the point concerning chills, he said that in the non-ferrous casting industry it certainly had not been taken too seriously in the past. In his experience, the thickness of chill seemed to be more important than the material of which it was made, and the surface condition of the chill was more important than the surface area. It had been urged by Mr. Raybould that old core coats should be removed; but Mr. Liddiard added that a little more attention could also be given to the artificial blackening of the chill in order to give it a better chilling effect from the surface.

It was normal practice in the aluminium sand casting industry in this country to use natural sand, and Mr. Liddiard asked if the Author had had much experience of the use of synthetic sands. From the technical point of view, though perhaps not always from the foundryman's point, one felt that more sand control could be obtained when using the so-called synthetic sands than when using natural sands with variable qualities, particularly as it was possible to achieve an even coating of the clay over the surface of the grains by using slurries when adding make-up water to the sand in re-conditioning. Perhaps the natural Bentonites and similar substances were not available in this country, as they were so freely available in the United States; we had to use the clays which we had available and endeavour to convert them to something like the

Aluminium Sand Foundry

clays used in the United States. However, he asked the Author to deal with the matter so far as the aluminium industry was concerned.

Sodium Porosity

MR. RAYBOULD agreed that the degree of control over synthetic sands was far greater than over the natural-bonded sands; foundrymen might object to that view, because he did not think the synthetic sands were quite so easy to handle. In particular, they were not so easy to mend up, for they were more friable and more likely to break away than were the natural-bonded sands. Overall, however, he felt that it would be advantageous to use the synthetic sands. Experience of the ease of handling natural-bonded sands, and of moulding with them, had prevented a much more drastic change-over to the synthetic sands, but he believed that this would increase as foundries became equipped with modern sand-milling machinery and distribution plant.

MR. G. C. PIERCE (past branch-president), referring to a test-bar in L.33 alloy which the Author had illustrated, said it had seemed to him that it was suffering somewhat from sodium porosity. Although the Author had remarked more on shrinkage porosity, Mr. Pierce wondered if he were entirely wrong in supposing that some part of the trouble, at any rate, was due to sodium porosity.

MR. RAYBOULD was frankly of the opinion that Mr. Pierce was wrong in that supposition. It was known, he said, that the silicon alloys, when modified, were prone to porosity, but whether or not that was sodium porosity was a matter of controversy into which he would not wish to enter. Experts disagreed on the matter; he had heard authorities state that there was no such thing as sodium porosity, and that what was thought to be sodium porosity was hydrogen porosity resulting from the use of sodium. But, however that might be, he believed the porosity in the L.33 test-bar was purely the result of solidification and not of gas. It would need to be severe gas porosity in any form if it were to be of so great an extent as in that particular case. The cavities were irregular in shape, whereas the cavities due to severe gas porosity were characteristically spherical, because the gas was under pressure.

The BRANCH-PRESIDENT said he supposed it was just as true with light alloys as with others that it was preferable to run the metal over a chill rather than up to it.

MR. RAYBOULD agreed.

The BRANCH-PRESIDENT added that the use of a mechanical paddle to agitate the molten metal under a flux for de-gassing had proved fairly successful.

MR. RAYBOULD replied that, without doubt, successful degassing depended upon both mechanical agitation and the chemical action, and probably the mechanical action was, if anything, the more important of the two. The only reason it was not used more extensively was that it involved a certain amount of complicated machinery, and it was felt nowadays that the same effect, or an effect equally great, could be obtained by bubbling gas into the metal, either from a tube or by generation from a chemical compound.

Question of Turbulence

MR. W. D. MENDHAM, who asked whether the Author favoured a large or a small downright, said that in connection with quite a number of small castings the question of turbulence arose frequently, especially on radiographic examination. If one used a large downright and fed the metal in quickly, there was a tendency to an excessive spurt into the mould, unless the pressure could be broken down at the gates. But if a small downright were used, there was a chance of taking bubbles of air, and so forth, from the runner bar into the casting.

MR. RAYBOULD regarded that matter as of the utmost importance, especially where one was very dependent on ensuring non-turbulent flow into a mould. He was absolutely convinced, and he had had many experiences to prove it, that blowhole formation was almost invariably caused by turbulence in pouring. If the pouring could be smoothed down so that the metal entered the mould quietly, one could eliminate most of the blowhole trouble, and that could be done to a surprising extent even though the metal had to travel a long way.

The answer to the question was that it was necessary to have a satisfactory ratio—he could not even say that it was a fixed ratio, for it varied with individual components—between ingates, runner channels and downgates. Only by ensuring that satisfactory ratio could one ensure smooth running and, at the same time, prevent the access of air into the mould, or the access of dross resulting from pouring from the ladle into the runner bush. But there was no doubt that the problem was very complex; recently he had had proof of its complexity and of the trouble that was likely to arise in that connection, particularly in magnesium castings, where the dross danger was greater than with aluminium base castings. American authorities had stated quite categorically that a certain ratio of downright, runner and ingate was best, whereas some Continental authorities held directly conflicting ideas. He could only say that there must be an ideal ratio, but he could not indicate what it was. Often one had to find it out by experiment, and obviously, all three conditions must be taken into consideration. If one condition, such as the size of the downright, were altered, that would upset the conditions of running into the runner and so on into the gate and into the casting.

Use of Tilted Platform

A SPEAKER asked if the difficulty due to turbulence could be overcome to a great extent by casting from a platform which tilted from the horizontal to the vertical.

MR. RAYBOULD agreed that tipping, and pouring the metal in gently, as was sometimes done in die casting, was an excellent method of casting. The Durville method, in which the die was placed vertically above

the crucible holding the metal, and then the whole assembly inverted, was ideal; but the extent to which that could be applied in sand casting was extremely limited. It was very unusual to be able to do anything in the way of tilting, although very often, if it were possible, that would be the best way out of the difficulty.

MR. HALE proposed the hearty thanks of the meeting to Mr. Raybould. Commenting on the weight ratio as between the actual casting and the finished casting, he said that in die casting, with which he was more particularly concerned, the ratios were about 2½:1. He knew cases, however, where the ratio was as much as 10:1 or even 15:1; and he cited the case of the Napier super manifold, made in RR.50 alloy, where the weight of the finished casting was about 28 lb., whereas the weight of the actual casting, with its runners and risers, was 100 lb. Nevertheless, they were reasonably successful in producing sound castings. The illustration given by Mr. Raybould, in which there was only about 100 lb. extra on a 150-lb. casting, was very creditable. During the war particularly, founders were asked to explain even a 5 per cent. wastage.

MR. G. C. PIERCE seconded. He recalled that it was 40 years since he had first worked with aluminium alloys, and said that one of the first things he was taught in regard to chilling was to break up some files, wire brush them as much as possible and treat them with a little oil and blacking. He had learned at the same time that, the thicker the chill itself, the deeper the chill effect in the casting; in other words, in casting a heavy boss, it was necessary to use a correspondingly heavy chill.

Mr. Pierce added that the meeting had listened to a first-class lecture; and if there were any present who might not have had much experience with aluminium alloys, he could assure them that they would be very well guided if they worked to the principles which Mr. Raybould had laid down in the lecture.

MR. RAYBOULD, in his response, said it was not always that he secured from the foundry side such complete agreement about what he had to say. It was difficult to be controversial and to be at the same time technically correct; one could not always be sure of everything, and it was only fair, when in doubt, to say so and thus to be true to one's technical training. He hoped, therefore, that by his Paper he had perhaps furthered the co-operation which he had been recommending between the technical side and the foundry side.

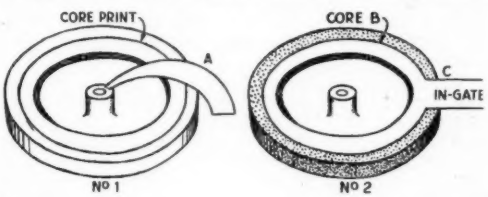
In that connection Mr. Raybould recalled the recently published articles by Dr. Wright, Lecturer in Metallurgy in Birmingham University, on the training of metallurgists, in which he had stated that he and his authorities recognised, that in addition to academic ability as a metallurgist, it was necessary for one entering the industry to be a good mixer, to have the knack of winning the confidence, respect and co-operation of the workmen with whom one associated. Mr. Raybould was confident that any successful works metallurgist must evince those characteristics.

HORN-GATES ARE TIME-SAVERS

By W. G.

In the moulding of some designs of castings, the use of horn-gates saves time in comparison with gates cut by moulders' tools. Also, they can be so placed that the metal will enter the mould from either the top or underneath the mould, a bottom-gate, in some instances, being the only safe method to employ. Fig. 1 shows a design of pattern which represents a grooved pulley, the groove formed by a dry-sand core. The core is indicated at B, Fig. 2.

These castings, of which 750 was the customer's first order, were moulded from a loose pattern, four in a box, and as horn-gates were not used in this particular foundry, the first 50 or so of the pulleys were poured with the metal entering the mould along a channel about an inch wide, filed in the core to the edge of the



pulley flange, as at C. The four channels were connected with a down-gate.

This method of gate-cutting was soon found to be both uneconomical and clumsy, and four horn-gates were cast in aluminium and used in pouring the remainder of the pulleys. One of the horn-gates is shown at A, ready set before ramming the sand round it.

Incidentally, one is tempted to comment on the slow method of moulding this type of casting when orders are periodically repeated, as in this case. Either a pattern-plate or board could be employed, with a saving of at least 50 per cent. of moulding time. In this case the flat gate at C would be the correct one, and would be permanently fixed to the plate pattern, thereby eliminating the cutting of gates.

NATIONAL COLLEGE FOR FOUNDRY INDUSTRY

A proposal by the Ministry of Education for the establishment of a National College for the foundry industry, within the Wolverhampton and Staffordshire Technical College, was approved on December 31, 1946, by Wolverhampton Education Committee. The National College is to be governed by an independent Board of Governors appointed by the Minister of Education, but including representatives of Wolverhampton Education Committee, Staffordshire Education Committee, and the Governors of the Technical College. Approved net expenditure, including the maintenance of a hostel for students, will rank for 100 per cent. grant.

OBITUARY

MR. A. M. CAWOOD, iron and steel merchant, of Glasgow, died recently.

MR. EDWARD OAKDEN, a director of the National Gas & Oil Engine Company, Limited, died recently.

MR. JAMES ALEXANDER BURNS, sole partner of J. A. Burns & Company, engineers, of Glasgow, died on March 7.

MR. W. S. THICKETT, who for many years was assistant traffic manager for Steel, Peech & Tozer, has died at Rotherham, aged 54.

MR. WILLIAM ALEXANDER LAING, assistant surveyor with Wilson & Burletson, consulting engineers, of Newcastle-upon-Tyne, has died at the age of 44.

MR. TELFORD CLARENCE BATCHELOR, who was joint managing director of Latch & Batchelor, Limited, wire drawers and wire-rope makers, of Hay Mills, Birmingham, from its inception until very recently, died on March 3.

MR. ANTHONY POOL, who has died at the age of 84, was for more than 40 years cashier and chief accountant at the Spring Vale Works, Preston, first with Alfred Hickman, Limited, and afterwards with Stewarts and Lloyds, Limited.

MR. ALEXANDER TULLIS, a partner in the Jarrow Welding & Boiler Company, Limited, has died suddenly. He was formerly manager of the British Arc Welding Company (North East Coast), Limited, South Shields. Mr. Tullis was only 39 years of age.

MR. F. W. CRADDOCK, who was associated for 65 years with Henry Rogers, Sons & Company, Limited, exporters and machinery contractors, etc., of Wolverhampton, died recently at the age of 86. When he retired a few years ago, he was manager of the company's export metal department.

MR. WILLIAM RICHARDSON, who was formerly a director and secretary of Wm. Park & Company, Forgemasters, Limited, Wigan, has died at the age of 75. He held similar positions with English Tools, Limited. Mr. Richardson retired in 1944. For some years he was honorary arbitrator to the Lancashire and Cheshire Miners' Permanent Relief Society.

MR. GEORGE DEARIE RUSSELL, chairman of Mitchell, Russell & Company, Limited, ironfounders, stove manufacturers, etc., of Bonnybridge, has died at the age of 68. In 1920, he entered into partnership with Mr. P. Neville Wood in the firm of Wood, Russell & Company, designers and patentees of the "Sentry" boiler. Nine years later he was appointed chairman of Mitchell, Russell & Company.

AT THE FIRST MEETING of the London branch of the Incorporated Plant Engineers, numerous suggestions were made which will enable the committee to plan a comparatively long-term programme of lectures, Papers and discussions.

STOCKS AND SALES OF NON-FERROUS SCRAP

The Ministry of Supply announces that the stock of non-ferrous scrap on charge on January 31 was 112,764 tons, made up as follows:—Q.F. cases and muffled S.A.A., 42,973 tons; ingots, 10,736; lead and lead alloy, 1,154; copper and copper alloy, 17,102; zinc and zinc alloy, 12,517; other grades (including mixed metal from cancelled contracts, Admiralty scrap, Army scrap, and M.O.W. scrap), 28,282 tons.

Sales for the two months' period December, 1946, to January, 1947, amounted to 18,230 tons (approximate value £920,000). The analysis was as follows:—Q.F. and muffled S.A.A., 3,441 tons; copper and copper alloy, 5,043; lead and lead alloy, 6,612; other grades (including zinc and zinc alloy), 3,134 tons.

Material put out to tender during the period amounted to 6,043 tons, of which 3,733 tons were lead. During the December-January period 21,148 tons were involved, the value being £1,067,692.

SALES OF GOVERNMENT SURPLUS STORES AND EQUIPMENT

Mr. Arthur Woodburn, Joint Parliamentary Secretary to the Ministry of Supply, announced at a Press conference recently that from the end of hostilities up to December 31, 1946, Government surplus stores and equipment were disposed of to the value of £330 million. The goods sold include locomotives, wagons and boilers, internal combustion engines, generating sets, ferrous and non-ferrous metals, and aluminium.

The total value of sales of machine tools and equipment, cutting tools, testing machines, engineering measuring instruments, fine measuring tools and gauges, diamond tools and ball and roller bearings sold is over £26 million. Of this, the larger portion relates to machine tools themselves, of which over 97,000 have been disposed of at a value of £25 million. Of surplus stocks of iron and steel, 2,090,000 tons, valued at £12,508,000, have been sold.

ANTI-ATTRITION METAL COMPANY'S CAPITAL

The Anti-Attrition Metal Company, Limited, are to increase their capital to £500,000 by the creation of an additional 3,000,000 2s. ordinary shares. The directors have agreed to purchase the whole of the issued share capital of Brecknell, Willis & Company, Limited, manufacturing electrical engineers, of Bristol, for £100,000. This is to be satisfied by the issue of 666,667 fully paid 2s. ordinary shares which will not rank for any dividends declared before July 31 next. The directors have received the Treasury consent to issue a further 1,333,333 2s. ordinary shares for cash at 3s. per share in the proportion of two for every three held at March 24. These shares will not rank for any dividends declared before July 31. Application will be made to the Council of the Stock Exchange for permission to deal in the new ordinary shares.

IMPORTS AND EXPORTS OF IRON AND STEEL

BOARD OF TRADE RETURNS FOR JANUARY

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in January. Monthly averages for 1938 are given for purposes of comparison.

Total Exports of Iron and Steel.

Destination.	Monthly average, 1938.	Month ended January 31.	
		1946.	1947.
	Tons.	Tons.	Tons.
Eire	4,643	6,569	5,946
Channel Islands	618	239	451
Malta and Gozo	192	464	469
Cyprus	138	101	107
Palestine	673	2,355	5,599
British West Africa	4,145	4,792	5,342
Union of South Africa	19,256	16,175	15,925
Northern Rhodesia	1,714	135	160
Southern Rhodesia	3,018	3,593	2,472
British East Africa	2,161	1,936	2,031
British India	13,222	6,945	8,029
Burma	1,543	1,292	4,822
British Malaya	5,549	2,451	6,610
Ceylon	2,169	503	1,350
Hong Kong	1,966	1,535	2,100
Australia	14,241	1,101	5,101
New Zealand	10,990	3,161	5,100
Canada	7,117	561	450
British West India Islands	3,687	1,796	4,269
Anglo-Egyptian Sudan	691	1,078	118
Other British Countries	1,496	646	3,080
Soviet Union	362	—	604
Finland	1,467	18	4,377
Sweden	998	7,325	9,631
Norway	1,689	8,021	4,987
Ireland	55	591	734
Denmark	7,271	7,315	10,062
Poland	207	432	53
Netherlands	4,297	12,165	9,047
Belgium	1,694	6,241	2,205
Luxemburg	9	—	401
France	1,116	6,464	2,171
Switzerland	232	2,005	1,076
Portugal	643	4,920	2,534
Spain	647	388	927
Italy	428	2	11
Greece	146	2,074	3,109
Turkey	1,146	1,848	1,466
Dutch East Indies	2,276	—	1,793
Dutch West India Islands	205	1,133	1,098
Belgian Congo	25	587	242
Portuguese East Africa	1,185	116	533
Syria	217	190	399
Egypt	2,867	13,052	4,941
Iraq	2,145	3,810	7,110
Iran	9,197	11,150	7,414
China	1,873	—	3,475
U.S.A.	182	32	1,316
Colombia	318	182	1,453
Venezuela	390	2,176	2,854
Ecuador	133	426	171
Peru	253	1,416	214
Chile	524	254	776
Brazil	1,416	9,689	4,266
Uruguay	632	950	665
Argentine	6,613	3,771	5,150
Other Foreign Countries	7,561	2,471	4,230
Total	159,656	168,642	181,026

MERCHANT STEEL is in much greater demand in Eire now than was the case several months ago, due to increased demands from the building industry and other industries. Supplies from home sources are not sufficient fully to meet this increased demand, and the Minister for Industry and Commerce has decided to grant facilities to importers to bring in steel free of customs duty.

Exports of Iron and Steel by Products.

Product.	Monthly average, 1938.	Month ended January 31.	
		1946.	1947.
	Tons.	Tons.	Tons.
Pig-iron	7,828	2	5,632
Ferro-alloys, etc.—			
Ferro-tungsten	43	58	41
Spiegeleisen and ferro-manganese	433	9,014	4,229
All other descriptions*	87	72	64
Ingots, blooms, billets and slabs	812	108	32
Iron bars and rods	266	630	445
Sheet and tinplate bars	1,032	103	—
Wire rods	265	325	241
Bright steel bars	549	2,057	2,747
Other steel bars and rods	8,500	19,937	17,238
Special steel	411	1,241	1,555
Angles, shapes and sections	5,573	11,163	10,729
Castings and forgings	135	121	493
Girders, beams, joists and pillars	2,789	5,911	3,957
Hoop and strip	3,115	4,397	4,566
Plates, ¼ in. thick and over	10,913	17,866	14,383
Black plates	1,211	1,037	3,537
Black sheets	5,292	1,998	3,487
Galvanised sheets	12,244	773	4,719
Tinplates	26,608	9,291	13,830
Tinned sheets	117	64	155
Terneplates	360	—	116
Decorated tinplates	364	112	123
Cast-iron pipes, up to 6-in. dia.	4,077	2,989	3,814
Do., over 6-in. dia.	3,580	3,919	3,129
Wrought-iron tubes	18,332	15,187	22,214
Radiators and central-heating boilers	336	109	386
Steel rails	8,833	22,171	9,575
Sleepers and fishplates	2,115	14,837	3,571
Spikes	234	354	323
Signalling equipment	105	157	716
Other railway material	1,892	795	1,593
Wire	4,599	4,055	7,140
Cable and rope	1,367	562	1,993
Netting, fencing and mesh	785	290	855
Other wire manufactures	806	280	993
Nails, tacks, etc.	317	789	649
Rivets and washers	711	651	670
Wood screws	209	479	322
Bolts, nuts, and metal screws	1,464	1,312	2,431
Stoves, grates, etc.	762	393	548
Sanitary cisterns	234	42	73
Fencing material	427	191	456
Anchors, etc.	528	225	844
Chains	524	573	938
Springs	328	301	520
Hollow-ware	892	4,411	5,663
All other manufactures	17,923	7,290	19,291
Total	159,656	168,642	181,026

* The figures for 1938 are not completely comparable with those for subsequent years.

Total Imports of Iron and Steel.

	Monthly average, 1938.	Month ended January 31.	
		1946.	1947.
	Tons.	Tons.	Tons.
British India	12,968	2,727	—
Australia	3	7,784	1,501
Canada	9,781	7,799	3,817
Other British Countries	466	69	583
Sweden	7,483	94	785
Norway	2,814	538	2,869
Belgium	22,806	4	1,017
Luxemburg	4,883	—	—
France	21,446	—	73
U.S.A.	16,724	6,511	15,303
Other Foreign Countries	12,644	7	1,932
Total	112,023	25,533	27,880
Iron ore and concentrates—			
Manganiferous	5,190	6,900	9,100
Other sorts	425,156	410,580	566,288
Iron and steel, scrap and waste, fit only for the recovery of metal	52,684	26,932	15,104

COMPANY RESULTS

(Figures for previous year in brackets.)

P. & W. Maclellan—Dividend of 7% (6%).

Valor Company—Dividend of 15% (same).

Evered & Company—Dividend of 15% (same).

Bruntons (Musselburgh)—Dividend of 20% (same).

Thompson Bros. (Bilston)—Interim dividend of 7½% (same).

Richard Thomas & Baldwins—Interim dividend of 5% (nil).

Aberdare Cables—Final dividend of 4%, making 10% (6%).

Brown Bayley's Steel Works—Interim dividend of 4% (5%), tax free.

Guest Keen Baldwins Iron & Steel Company—Dividend of 10% (7½%).

R. B. Pullin & Company—Final dividend of 12½%, making 12½% (17½%).

General Refractories—Dividend of 10% (7½% and Victory bonus of 1½%).

British Aluminium Company—Final dividend of 8%, making 10% (8%).

Leeds Fireclay Company—Interim dividend of 4% (nil) on the 6% preference shares.

Waste Heat & Gas Electrical Generating Stations—Final dividend of 5½%, making 8% (same).

Barrow Hematite Steel Company—Final dividend of 7½%, making 12½% (one payment of 10%).

Glover & Main—Final dividend of 10% (11%) and bonus of 15% (7½%), making 30% (22½%).

Alfred Herbert—Dividend of 11% (15%), tax free, and special capital dividend of 9% (5%), tax free.

Engineering Components—Final dividend of 15% (same) and bonus of 5% (nil), making 30% (25%).

Clayton Dewandre Company—Final dividend of 6% (same) and bonus of 2% (nil), making 12% (10%).

Swan, Hunter & Wigham Richardson—Final dividend of 8%, making 12% (same) and bonus of 4% (2%).

Midland Electric Manufacturing Company—Dividend of 20% (15%) and bonus of 15% (same) making 35% (30%).

Steel Barrel, Scammells & Associated Engineers—Final dividend of 9% and bonus of 5%, making 20% (same). Interim dividend of 6% on account of 1946-47 (same).

J. & E. Hall—Net profit for the year ended September 30, after E.P.T., income tax, depreciation, etc., £55,772 (£53,911); dividend of 10% (same); forward, £137,072 (£109,720).

Union Steel Corporation (of South Africa)—Final dividend of 5% and bonus of 2%, making 10% (same). Dividends on the 8% "A" and "B" participating preference shares of 10% (same).

Anti-Attrition Metal Company—Net loss to July 31, £15,068 (£4,198 profit); brought in, £12,876; provision for tax no longer required, £16,000 (£17,000); dividend of 7½% (15%); forward, after deducting loss, £5,058.

Electrolytic Zinc Company of Australasia—Net profit to June 30, £381,537 (£324,491); dividends, £330,000 (£270,000); new plant and development of West Coast Mines, £14,146 (£12,250); forward, £215,109 (£277,718).

Airscrew—Net profit to March 31, 1946, after reserve for obsolescence, etc., £48,399 (£62,170); to income tax, £28,407 (£32,901); final dividend of 15%, making 25% (same); reserve, nil (£15,000); forward, £37,072 (£30,393).

Mather & Platt—Net profit for 1946, after depreciation, provision for income tax, etc., £145,428 (£107,316); to reserve, £50,000 (£25,000); employees' benefit fund, £5,000 (£2,000); final dividend of 7% (6%), making 11% (10%); forward, £88,401 (£91,474).

M. Mole & Son—Net profit for 1946, after depreciation, income-tax and E.P.T., £16,865 (£8,603); dividend of 15% (10%) and bonus of 5% (2½%); to general reserve, £3,000; deferred repairs and contingencies reserve, £3,500; forward, £9,636 (£8,435).

Platt Bros. (Holdings)—Interest on the 3½% debentures for the current half year and a final dividend of 2¼% on the 4½% cumulative preference stock. The question of a final dividend on the 7% preference stock is deferred until the full accounts are completed.

John Oakey & Sons—Net profit for 1946, £31,557 (£23,938); to general reserve, £5,000 (same); final ordinary dividend of 10%, making 12½% (same) and bonus of 2½% (nil); dividend and bonus of 15% (12½%) on the issued employees' shares; forward, £13,234 (£11,295).

D. Napier & Son—Trading profit, after tax, for the 15 months ended December 31, £146,931 (£133,896 in previous year); depreciation, £43,579 (£31,674); written off goodwill, £150,000 (nil); dividend of 7½% for period (same for previous year); forward, £244,685 (£340,438).

Power Securities Corporation—Net profit for 1946, before tax, £112,802 (£103,369); to tax, £49,774 (£38,872); general reserve, £20,000 (same); contingencies reserve, nil (£1,637); preference dividend, £19,250 (£17,500); ordinary dividend of 6% (same); forward, £57,529 (£60,151).

Shanks & Company—Net profit for 1946, after providing for taxation, depreciation, etc., £83,415 (£26,186); to general reserve, £30,000 (nil); employees' pension reserve, £10,000 (nil); special depreciation on plant and machinery, nil (£7,500); dividend of 15% (10%); forward, £77,095 (£60,170).

Belfast Ropework Company—Net profit for 1946, after trade charges, depreciation, income-tax, E.P.T., etc., £75,447 (£44,440); preference dividend, £2,625 (£2,500); ordinary dividend of 8% (same) and bonus of 5% (2½%); to dividend reserve account, £10,000 (same); forward, £40,978 (£21,057).

Aeroplane & Motor Aluminium Castings—Trading balance to March 31, after crediting £16,000 (£69,000) in respect of E.P.T. repayable, £27,901 (£31,539); to depreciation, £7,684 (£10,320); provision for income tax, £13,000 (same); future income tax liability, £4,000 (nil); dividend of 5% (same); forward, £30,895 (£30,778).

Bruce Peebles & Company—Profit for 1946, after providing for taxation and depreciation, £29,474 (£20,367); to research and development reserve, £15,000 (£10,000 to general reserve); ordinary dividend of 5% and bonus of 5%, making 10% (8%); dividend of 10% on the 7½% participating preference shares (same); forward, £18,095 (£16,208).

Delta Metal Company—Profit for 1946, after E.P.T., deferred repairs, etc., £216,313 (£212,529); to provision for income tax, £135,000 (same); staff fund, £2,000 (same); dividend of 12½%, tax free (same) and bonus of 10% (7½%), tax free; reserve for equalisation of dividends, £10,000 (same); export development account, nil (£5,000); forward, £33,138 (£31,325).

Burnell & Company—Net profit for 1946, after providing for depreciation, taxation, etc., £50,640 (£36,112); to general reserve, £10,000 (£15.000); staff pensions, etc., £10,000 (nil); final ordinary dividend of 12½%, making 20% (15%); participating dividend of 3.5773d. (1.568d.) per share on the 17½% cumulative participating preference shares; forward, £58,387 (£39,977).

Smith's Dock Company—Profit for the year ended September 30, £536,397 (£273,441); directors' fees, £4,758 (£4,620); depreciation, £60,000 (£40,000); special contribution to pension fund, £40,788 (a year ago £15,000 from available balance); E.P.T., £190,000 (£60,000); income-tax, £125,000 (£85,000); net profit, £115,872 (£83,835); to plant improvement and extension reserve, £50,000 (£30,000); dividend of 8% (7%) and special bonus of 2% (nil); forward, £31,921 (£26,549).

Brooke Tool Manufacturing Company—Trading profit to September 30, nil (£74,520); fees, £16 (£18); investment income, £536 (£2,844); sale of plant, etc., £5,081 (nil); estimated E.P.T. repayable, £61,000 (nil); to loss on trading after management remuneration and depreciation, £29,260 (nil); directors' fees, £950 (same); employees' bonus, £4,300 (£5,500); superannuation, £1,825 (£2,068); war damage, nil (£247); tax, nil (£30,000); profit. £30,298 (£38,617); to general reserve, £20,000 (£15,000); dividend of 10% (17½%); forward, £29,203 (£29,905).

WE OFFER OUR heartiest congratulations to the firm of Shaw & McInnes, Limited, ironfounders, etc., of Glasgow, on the attainment of their centenary. Actually this occurred last year, and to commemorate the event a brochure has been prepared. In it, the major events in the firm's history have been correlated with national and international happenings. The military and civic honours awarded to members of this family business are, indeed, noteworthy and reflect the great contribution this company has made to Britain's steady progress.

CONTRACTS OPEN

Any date given is the latest on which tenders will be accepted. The address is that from which forms of tender may be obtained.

Blackpool, April 12—Cast-iron specials, for the Fylde Water Board. Mr. G. F. Atkinson, engineer, Sefton Street, Blackpool.

Chippenham, April 5—Provision and laying of approx. 550 yds. of 6-in. dia. spun-iron pipes, and approx. 550 yds. of 4-in. dia. spun-iron pipes, etc., for the Town Council. Mr. C. R. Phillips, borough surveyor and water engineer, The Old Palace, 10, Market Place, Chippenham, Wilts. (Fee £2 2s., returnable.)

Fareham, April 8—Providing and laying of about 6,900 yds. of 6-in. and about 500 yds. of 6-in. and 9-in. sanitary pipes, etc., for the Urban District Council. Waterhouse & Rounthwaite, consulting engineers, 3, Ellison Place, Newcastle-upon-Tyne. (Fee £2 2s., returnable.)

High Wycombe, March 29—Manhole covers and frames, gully grates and frames, etc., for the Corporation. Mr. J. A. Parkinson, borough engineer, Municipal Offices, High Wycombe.

Market Bosworth, March 31—Construction of approx. 13,850 yds. of 3-in. dia., 5,550 yds. of 4-in. dia. and 4,070 yds. of 6-in. dia. spun-iron water mains, etc., for the Rural District Council. Mr. T. Stanford Griffin, engineer and manager, City of Leicester Water Department, Bowling Green Street, Leicester. (Fee £5 5s., returnable.)

Merthyr Tydfil, March 29—Provision, laying and jointing of approx. 3,027 yds. of 3-in. and 1,610 yds. of 4-in. class D cast-iron water main, etc., for the Town Council. Mr. G. E. Mitchell, borough engineer and surveyor, Town Hall, Merthyr Tydfil. (Fee £5 5s., returnable.)

F. H. LLOYD & COMPANY'S ACQUISITION

F. H. Lloyd & Company, Limited, steel founders, of Wednesbury, Staffs, has agreed to purchase the whole of the ordinary share capital of the Parker Foundry (1929), Limited, of Derby. The company will be operated as a subsidiary of F. H. Lloyd & Company. Mr. T. J. B. McLean, managing director of the Parker Foundry, will join the reconstituted board.

F. H. Lloyd & Company has also acquired from the Ministry of Supply the foundry at Burton-on-Trent which the company has been operating as agents for the Ministry during the war years. A new company is being formed to operate this foundry, also as a subsidiary of F. H. Lloyd & Company, under the name of Lloyds (Burton), Limited.

A FIRE OCCURRED at the Chesterfield branch offices of Wm. Cumming & Company, Limited, recently, the building and contents being destroyed. The works were not affected. Temporary offices have been set up at the same address—Whittington Mills, Chesterfield.

PERSONAL

MR. F. WARRILOW has been appointed secretary of Hadfields, Limited.

MR. R. WATSON, outside manager with the South Durham Steel & Iron Company, Limited, has received an appointment with Richard Thomas & Baldwins, Limited.

MR. DOUGLAS MYLES, of Douglas Fraser & Sons, Limited, Westburn Foundry, Arbroath, has been awarded the Hele-Shaw prize by the Institution of Mechanical Engineers.

MR. S. SMITH has been appointed managing director of the Wellman Smith Owen Engineering Corporation, Limited, in place of the late Mr. J. Foster-Smith. MR. C. J. BARKER has been appointed to the board.

COL. P. G. J. GUETERBOCK has been re-elected president of the Institute of Metals. MR. JOHN CARTLAND has been elected vice-president. He is a director and works manager of Fry's Metal Foundries, Limited.

MR. W. B. D. BROWN, managing director of the Glacier Metal Company, Limited, at the request of the President of the Board of Trade, has agreed to serve on the first Council of the British Institute of Management.

MR. J. A. RICHARDS has resigned his position as managing director of the Crane Foundry Company, Limited, to become director manager of Walter Macfarlane & Company, Limited, architectural and sanitary ironfounders, of Glasgow.

LORD BRUCE OF MELBOURNE has been appointed chairman of the Finance Corporation for Industry, Limited, in succession to Lord Hyndley, whose work as chairman of the National Coal Board has made it impossible for him to continue as chairman of the F.C.I.

MR. ALEX. JOHNSTON was presented with a gift of War Savings Certificates to mark his retiral from the post of foreman patternmaker with Mitchell, Russell & Company, Limited, Bonnybridge. Mr. James Mitchell, managing director, handed over the gift and paid tribute to Mr. Johnston's service of 33 years.

MR. HAROLD HUMPHRIES, who has been appointed to the board of directors of Hadfields, Limited, joined the company in February, 1945, as commercial manager and later became a local director. During the war he served with the Iron and Steel Control. Mr. Humphries is a member of the Executive Council of the British Steel Founders' Association.

MR. PHILIP B. JOHNSON, a director of R. & W. Hawthorn, Leslie & Company, Limited, and chairman of the Parsons and Marine Engineering Turbine Research and Development Association, has been elected president of the Engineering and Allied Employers' National Federation for a second year. SIR HARRY RAILING, chairman of the General Electric Company, Limited, and SIR ROBERT MICKLEM, chairman and managing director of Vickers-Armstrongs, Limited, have been elected vice-presidents of the Federation.

FEBRUARY PIG-IRON AND STEEL PRODUCTION

Iron and steel production figures for February show a substantial decline compared with a year ago, a factor that can be attributed largely to the restricted fuel supplies.

Pig-iron output was at the rate of 6,560,000 tons a year, compared with 7,806,000 tons in January and 7,599,000 tons a year ago.

Production of steel was at the annual rate of 10,726,000 tons, compared with 12,470,000 tons in January and 12,854,000 tons in February, 1946.

Details of the production figures (in tons) are given in the table below.

	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual rate.	Weekly average.	Annual rate.
1947—January ..	150,100	7,806,000	239,800	12,470,000
February ..	126,200	6,560,000	206,300	10,726,000
1946—January ..	143,600	7,465,000	228,600	11,887,000
February ..	146,100	7,599,000	247,200	12,854,000
November ..	153,900	8,002,000	263,800	13,715,000
December ..	153,200	7,966,000	236,300	12,289,000
Year	149,300	7,761,000	244,100	12,693,000
1945—November ..	150,000	7,801,000	247,500	12,870,000
December ..	145,500	7,653,000	221,500	11,519,000
Year	136,700	7,107,000	227,400	11,824,000

UNITED KINGDOM TIN POSITION

The Ministry of Supply has released the following figures showing the United Kingdom tin position for the month of January:—

	Ministry.	Consumers.
	Long tons.	Long tons.
TIN METAL:		
Stocks at January 1	7,779	4,130
Arrivals	—	—
Production	3,112	—
	10,891	4,130
Deliveries:		
To U.K. consumers.. .. 2,419	—	2,419
For export 498	2,917	—
		6,549
Consumption	—	2,639
Stocks at January 31	7,974	3,910*
TIN ORE (Tin content):		
Stocks in U.K. at January 1 ..	8,947	
Stocks in U.K. at January 31 ..	7,731	

* Calculated. Reported 3,651 tons.

IN ORDER TO INITIATE a financial link between the two companies, with a view to securing closer business and technical collaboration, it is proposed that the Telegraph Construction & Maintenance Company, Limited, issue 100,000 shares of £1 each to Johnson & Phillips, Limited, and Johnson & Phillips issue 67,000 shares of £1 each to the Telegraph Construction & Maintenance Company.

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NEWS IN BRIEF

LAST WEEK, a little belatedly, the Institution of Production Engineers celebrated their Jubilee by holding a dinner at the Connaught Rooms. Since its inauguration the Institute has made great progress and membership now exceeds 7,000.

THE BUSINESS of ironfounders carried on under the name of R. J. Lugg at Brimscombe, Glos, has been converted into a limited company under the registered trade name of H. Hewins, Limited. The company will continue to operate from Port Foundry, Brimscombe.

AT THE RECENT LAUNCHING of a ship for Brazilian owners, Mr. Cresswell Pyman, managing director of William Gray & Company, Limited, West Hartlepool, said that it had been contracted to deliver the vessel in July. Instead of being six months' late, as was customary these days, the vessel would be handed over some weeks ahead of contract date.

THE DECEMBER, 1946, issue of the "Nickel Bulletin" contains a subject index to Vol. 19, as well as many interesting abstracts. Among these, there is considerable material on electro-polishing and electrodeposition, together with useful data on cast irons. The "Bulletin" is obtainable free of charge from the Mond Nickel Company, Limited, Grosvenor House, Park Lane, London, W.1.

THE LONDON CHAMBER OF COMMERCE, in a report on the Industrial Organisation Bill which they sent to the President of the Board of Trade, state that their fundamental objection to the Bill is that the multiplication of committees superimposed on industry, consisting largely of persons without intimate knowledge of the industry which they are to instruct and advise, or without any practical experience in the administration of that industry, is not calculated to assist in the recovery of this country's industrial position. The Chamber believe that some of the functions of the proposed development councils could be organised more efficiently on a national basis than industry by industry.

MR. LEONARD LORD, chairman and managing director of the Austin Motor Company, Limited, in a recent speech, said that the manufacturers were not now controlling industry; it was the workmen who decided how many hours they would work, what they should be paid, and how much work they should put in. "We are told," he said, "that we must co-operate with the workers. With whom are we going to co-operate—the shop stewards? The shop stewards are Communists. The production committees have for the most part good trade unionists, men we have known for years, but the factories have been sold to the Communist shop stewards, not by this Government, but by the last."

MR. G. B. WILLIAMS, deputy chairman of John Williams & Sons (Cardiff), Limited, engineers, ironfounders, etc., unveiled "The Harold Williams Bed" at the Cardiff Royal Infirmary, the bed having been subscribed for by the directors, shareholders, staff and work people of the company and others to mark the centenary of the company in memory of the late Mr. H. M. Williams. Mr. C. E. Williams, chairman of the company, who is now in his 81st year, was unable to be present at the ceremony owing to illness. The late Mr. Harold Williams was the father of Mr. H. J. V. Williams, who was president of the Wales and Monmouth branch of the Institute of British Foundrymen.

ADDRESSING THE GLASGOW BRANCH of the Incorporated Sales Managers' Association on "The British Steel Industry To-day," Lt.-Col. T. R. Craig, a director of Colvilles, Limited, said that if any factor was going to limit the development of the industry it would be the amount of the coking coal available. In the past, iron and steel makers had been able to safeguard their position by taking an interest in colliery companies; now that the mines were nationalised they could only hope that those responsible for the future distribution of coal would remember the special needs of their industry. The Scottish steel industry was planning to raise its present annual output of 1,800,000 tons to 2,250,000 tons within the next 10 years, he said.

IN HIS SPEECH at the recent annual meeting of Leyland Motors, Limited, Mr. C. B. Nixon, the chairman, said that during the year they completed the purchase of the Sayner Lane Foundry, Leeds, where during the war light alloy castings were made, and which was operated by the company as a shadow factory for the Ministry of Aircraft Production. A wholly owned subsidiary company had been registered under the title of West Yorkshire Foundries, Limited. This had enabled them to close the non-ferrous foundry at Leyland. To supplement the output of the ferrous foundries at Farrington, iron was also being cast at Leeds, and although they had not so far completed the changeover, or a year's trading, he was glad to report that profits were being earned, and a vital contribution made to the maintenance of Leyland vehicle output.

ALUMINIUM WIRE & CABLE COMPANY

The Aluminium Wire & Cable Company, Limited, which was formed recently by the British Aluminium Company, Limited, Hawker Siddeley Aircraft Company, Limited, and Tube Investments, Limited, has arranged to purchase premises at Port Tennant, Swansea, from the Ministry of Supply. The company will enter into occupation as from May 1. Modifications to buildings and the installation of plant will be carried out as soon as possible, and it is anticipated that some production will start towards the end of the year. The company's temporary offices are at Salisbury House, Circus Place, London Wall, London, E.C.2.

RECENT WILLS

WOOD, WILLIE, a local director of Thos. W. Ward, Limited	£3,724
EDWARDS, W. S., managing director of the C. W. Engineering Company, Limited, president of the North Staffordshire Engineering Employers' Association, and vice-president of the Birmingham, Wolverhampton and Stafford District of the Engineering and Allied Employers' Association	£61,339

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Raw Material Markets

IRON AND STEEL

Linked with the hint of worse to come, the decline of over 95,000 tons in the February output of pig-iron and a drop of 134,000 tons in the month's production of steel ingots is disturbing. The shrinkage has, in fact, been rapid and continuous since November last, and it has become improbable that the aggregate output figures for 1946 can be excelled or even equalled during the current year. The announcement of an agreement in the iron and steel industry providing for the continuous operation at week-ends in mills and melting shops has been warmly welcomed. The effect of the agreement on output will be substantial.

Quite clearly there is not enough pig-iron to go round. Stringency is most acute in regard to common foundry iron and more will have to be provided to get the light foundries back into full production; otherwise there will be a serious bottleneck in the building trade where the need for more castings, baths, heaters, cookers, etc., is more urgent than ever. A heavier demand for hematite, medium- and low-phosphorus and refined iron has also developed, and though reasonable tonnages are available, the abnormal weather and the chaotic condition of rail transport have seriously retarded deliveries.

Supplies of billets, blooms, etc., reaching the re-rolling plants of late have been totally inadequate, and the prospects of any substantial improvement are distinctly discouraging. The flow of material from the United States, and, to a smaller extent, from the Dominions, has not entirely dried up, but these tonnages are insufficient to bridge the gap between home production and the overall requirements of the re-rolling industry. In these circumstances steelmakers are concentrating on the production of bars for the sheet mills and re-rollers of bars, strip, etc., are using any sort of defective material which comes on offer, to augment the meagre tonnages of primes which are coming forward.

Operation of the heavy rolling mills is still irregular, but the lack of transport is the more formidable difficulty. There is still a lot of material awaiting delivery, and it is hoped that with the end of the great freeze-up, railway facilities will improve. Nevertheless, the position in regard to steel supplies must be one of continuing anxiety. Demand is well in excess of production and consumers still insist that too much material is being shipped abroad to the detriment of home industries. Even the shipyards have not of late been getting their full weekly quotas of plates and angles, and the sheet works are quite unable to cope with the spate of orders on offer. Still bigger demands for colliery equipment are envisaged and the railways will need immense tonnages of rails, sleepers, chairs, points and crossings to restore them to full efficiency.

THE SERIAL NUMBERS of the cover of the last two issues have, through the fortnight's suspension of publication, been wrongly advanced by two digits. The Editorial numeration has been correct, so for the next two weeks the cover serial will carry the letter A, after which the numbering will be correct again.

NON-FERROUS METALS

Output of many materials essential to the production of non-ferrous semis has been badly affected by the fuel crisis, while the position has been further aggravated by the severity of the weather in recent weeks. Snow and ice conditions have been followed by gales and extensive flooding, with the result that transport has been seriously disorganised. On the whole, however, plants have not actually been held up by lack of raw material.

Supplies of copper seem to be sufficient to cover present requirements, which have been restricted of late owing to the fuel shortage at consuming plants.

Referring to the drop in U.S. zinc output in 1946 (759,212 short tons, compared with 799,520 tons in the previous year), Mr. Ernest V. Gent, secretary of the American Zinc Institute, says that this was due principally to strikes and shortage of labour. The fact that price control policies when rising costs and higher world market levels were disregarded was another serious handicap to production, he says.

A substantial increase in the official price of lead is expected to be made shortly. Imports of lead in January last, in the region of 14,000 tons, were less than the current rate of consumption. The present level of imports is very unsatisfactory. In 1938, average monthly imports were no less than 33,930 tons.

NEW PATENTS

The following list of Patent Specifications accepted has been taken from the "Official Journal (Patent)." Printed copies of the full Specifications are obtainable from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. *each.*

583,039 CARBORUNDUM COMPANY. Silicon carbide articles and method of making the same.

583,055 SENOR, J. H., and RUSTPROOF METAL WINDOW COMPANY, LIMITED. Galvanising of metal articles.

583,099 FIEVEZ, E. C. L. Process of fabrication of coated rods for welding.

583,142 STANDARD TELEPHONES & CABLES, LIMITED, and MADDOCK, A. J. Coating insulating surfaces with metal.

583,157 WHITTAKER, E. H. Foundry flasks.

583,162 MOND NICKEL COMPANY, LIMITED, and PFEIL, L. B. Heat-resisting alloys.

583,165 BRITISH IRON & STEEL CORPORATION, LIMITED, RILEY, H. L., and TAYLOR, J. Carburisation of steel.

583,205 METALLSCHLAUCHFABRIK AKT.-GES. Production of highly elastic corrugated tubes made of profiled metal band material.

583,226 BUDD WHEEL COMPANY. Rolling mills.

583,287 KERSHAW, SEN., J., KERSHAW, JUN., J., and KERSHAW, L. W. Flame treatment of ferrous metals.